

ADVANCED  
ECO-FARMING  
TECHNOLOGY  
TO ACHIEVE SUSTAINABLE  
AGRICULTURAL  
GROWTH IN SARAWAK



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Pusat Khidmat Maklumat Akademik  
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*Dedicated  
To  
People Who Struggling for Food  
And  
People Who Are Contributing ro Healthy Food Production*

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## **Preface from Vice Chancellor, Universiti Malaysia Sarawak**

**T**he advancement of Eco-Farming Technology in achieving Sustainable Agricultural Growth in Sarawak is an important issue for the state's economy. Sarawak is blessed with abundance of agricultural resources and has been a net food importer for many years. Traditional agriculture has been practiced in Sarawak through conventional irrigation, chemical fertilization, and manual harvesting methods.

Recent revenue statistics of palm oil and timber indicate that farm productivity of commercial crops is decreasing due to short supply of labor, slow growth of planned forest, and manually operated harvesting system. Wastewater and waste biomass of palm oil, pineapple, and poultry manure have become a threat to health, economy, and environment.

This book demonstrates the current strengths and weaknesses of agro-industry in Sarawak. The significance of this book is reinforced by adding growth potentials and barriers of agricultural products with highest value such as timber, palm oil, and other commercial crops. Furthermore, this book focuses on the issues of conventional

agricultural methods and the solutions in producing required healthy foodstuff. Also, this book discusses the ways of increasing farm productivity and converting waste products into useful resources for public awareness.

The information in this book is organized to highlight the importance of implementing advanced eco-farming technology to improve farm productivity. There are also a few guidelines for the execution of this technology in Sarawak which are listed in this book such as exploring various innovative options that are available within the region and other developed nations; applying scientific knowledge in farming to improve quality of crops and ensuring its higher value along the agricultural chain; increasing research capacity building by introducing collaborative research among government agencies, farms and universities in developing appropriate and sustainable farming technology.

It is my sincere hope that the information obtained from this book will be able to assist researchers, consultants, industrial professionals and policy makers in formulating strategies in managing sustainable growth of the agricultural sector. Finally, I would like to acknowledge the efforts of those who participated in publishing this book especially the writers and researchers.

**Professor Dato' Dr Mohamad Kadim Bin Suaidi**

Vice Chancellor

Universiti Malaysia Sarawak



## **Preface from Assistance Minister of Agriculture, Sarawak**

**W**ith increasing pressure to produce required healthy foods for the growing local population and for export markets, Sarawak needs to come up with new approaches in agricultural development in the State. Hence, advanced eco-farming technology should be introduced to satisfy the needs of the present without compromising the ability of future generations to meet their needs by utilizing the available natural and human resources pragmatically. As it evolves over the years, the main goals of this sustainable agriculture are expanded to cover environmental health, economic profitability as well as social and economic equity. The whole food supply chain must be reviewed to achieve both economic and environmental sustainability in farm production, processing, distribution, consumption and waste recovery. In order to improve environmental sustainability, we need critical mass of such farming operations at local, regional or national scale in order to ensure effective implementation of new agricultural development programs.

In our effort to modernize our production system by converting traditional to modern eco-farming, we should utilize information





## **Advanced Eco-Farming Technology to Achieve Sustainable Agricultural Growth in Sarawak: A Research Outlook**

**T**his book highlights the productivity, strengths, weaknesses, and growth barrier of agro-industry of Sarawak. The focuses of this book are on the growth potentials and barriers of commercial crops such as timber, palm oil, poultry, and other agricultural products in the aspect of food security, sustainable agricultural and economic growth of the state. The information and data printed in this book are the research outcomes conducted in Sarawak Agriculture Industry. This book would be a potential reference for researchers, consultants, policy makers and government agencies especially those who are working in these fundamental areas to achieve food security and sustainable agricultural growth.

Traditionally, agricultural activities in Sarawak depends on conventional farming that result in low farm productivity, and dependence on imported foodstuff including Rice, Dairy, Animal meats, and Juice products. On the other hand, wastes including POME, poultry litter and timber wastes become environmental hazard. This book demonstrates the process of Eco-Farming for producing required healthy food from locally available resources; and agro-

waste conversion to energy and organic fertilizer for achieving environmental sustainability.

Sarawak needs to adopt advanced technology, and more problem-based research to address current growth barriers to agricultural activities. This book demonstrates problems and related solutions regarding optimization of available agricultural resources for producing required organic and healthy foodstuff. By increasing farm productivity of agriculture in line with the theme of Advanced Eco-Farming technology, agricultural industry of Malaysia especially in Sarawak is able to achieve sustainable agricultural growth.

**Professor Wan Hashim Wan Ibrahim**

Deputy Vice Chancellor (Academic and International)

Universiti Malaysia Sarawak



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Readers may find some information or irrelevant data and typological error in this book; the authors will be happy and grateful to get feedback for the purpose of improvement.

**Professor Dr. M. Shahidul Islam**

Universiti Malaysia Sarawak

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## CHAPTER ONE

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### **An overview of Agriculture in Sarawak**

#### **1.0 Agriculture the Driver for Achieving Sustainable Economic Growth: An Insight View of Sarawak**

**T**he agriculture of Sarawak is like an engine for the state's economy. This sector is one of the largest employers and plays a central role in Malaysia's economy as a whole, by producing foodstuff for local consumption and cash crops to the export market. This chapter is designed to bring insights on the status of agriculture of Sarawak, which includes contribution of agro-industries to state GDP, challenges of agro-industries for achieving food security, current agriculture growth policy of government, and potential benefits of Advanced Eco-Farming technology for higher farm productivity.

Sarawak is a food import state due to the lack of production facilities and capabilities. In the early 1870s, there was a problem of rice shortage in the state, and Rajah Charles (1868-1917) encouraged local rice producers to start rice-growing by awarding prizes for the best crops. During that time, farmers at Upper Sarawak were also motivated towards paddy cultivation. Furthermore, a policy was introduced in bringing experienced paddy planters, like Javanese

and Madurese to establish farming communities in the state to grow more paddies, but there was no significant improvement.

Currently, the state of Sarawak is working to achieve long-term sustainability in food security; it is one of the prime strategies of the Sarawak state government.

**1.1 Current Contribution from Agriculture to State GDP**

Sarawak’s economy transformation program was formed based on the Economic Transformation Programme (ETP) of Malaysia. Practically, Sarawak Corridor of Renewable Energy (SCORE) becomes the foundation of economic development of Sarawak State. This state managed to achieve 4.5 to 5 percent annual growth rate over the last few years despite the slowdown in the global economy. Indeed, crop products of agro-industries have made a significant contribution to this achievement. The production of palm oil, timber, rice, fish, poultry, fruits and vegetable are the potential elements of agribusiness and agro-industries of the state. The major agro-products and agro-industries of Sarawak are presented in Table 1.0a and 1.0b.

*Table 1.0a: Major Agro Products of Sarawak*

Major Agro Products	Landing of Marine Fish By Gear Group
Oil Palm	Trawl Nets
Cocoa	Drift/Gill Nets
Rubber	Bag Nets
Paddy	Push/Scoop Lift

Pepper	Net Hooks
Livestock	Lines
Cattle Population	Forest And Forest Products
Buffaloes	Saw Logs
Goats Population	Sawn Timber
Sheep	Plywood
Swine	Laminated Boards

Table 1.0b: Major Agro Products of Sarawak

Major Agro Products	Landing of Marine Fish By Gear Group
Agro Industry	Mouldings / Dowels
Poultry Birds	Woodchips
Egg	Veneer ( '000 m <sup>3</sup> )
Milk	Particle Board
Coconut milk	Medium Density Fibreboard
Smallholder Meat processing	Timber Process
Smallholder Fruit Juice Process	Office and Residential Furniture

For the past two decades, timber and palm oil have been Sarawak's top agricultural exports, and in recent years, the palm oil industry alone has accounted for 3-8 percent of GDP<sup>2</sup>. The Sarawak government has taken initiatives to reinforce agriculture to make this sector long-term and sustainable for achieving food security. This indicates that the agriculture sector is expected to grow smoothly. A few government organizations are also involved in the agricultural

sector to make it a successful venture. Moreover, the state believes that industrialization within the Sarawak Corridor of Renewable Energy will provide greater support for agriculture to ensure continuous inputs to downstream product processing activities. Furthermore, palm oil and timber products are expected to continue its contribution to achieve sustainable economic growth in Sarawak.

## **1.2 Challenges Faced by Agro-Industries towards Achieving Food Security**

Although agriculture of Sarawak is one of the important contributors to GDP but predominantly; Sarawak is a food importer state due to its low farm productivity. Short supply of farming labour force, traditional farming, manual harvesting procedures and the absence of effective supply chain networks are the identified growth barriers to the agricultural sector. Low quality post harvesting facilities, lack of R&D on the production process and outdated technology adopting capabilities in farming contribute to the increase of food insecurity in Sarawak.

In fact, higher farm productivity by maintaining biodiversity and environmental sustainability could bring food security. But the current agribusiness and agro-industries are operating based on traditional farming, which violates the principles of sustainable development. Around the state, conventional farming contributes to environmental pollution; the use of petrochemical inputs brings damage to the soil and water resources and ultimately farm productivity continue to depreciate <sup>3</sup>.